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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/616,161	07/14/2000	Evgeny Yakhnich	2681/OH422	5315

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EXAMINER	
TSE, YOUNG TOI	
ART UNIT	**PAPER NUMBER**
2634	8

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/616,161	YAKHNICH ET AL.	
	Examiner	Art Unit	
	YOUNG T. TSE	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 27 and 28 are objected to because of the following informalities: in line 1 of both claim 27 and claim 28, "wherein step" should be –wherein said step--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 15-16 and 32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The configuration of claims 15-16 and 32 does not correspond to the disclosure of the drawings.

For example, claims 15 and 16 recite a circuit switch data means and a packet switch data means for converting said decoded output data signal to a data stream, respectively. However, the only switch shown in the Figures is the sampler 90 (or an A/D converter) in Figure 4 for converting analog signals into digital signals.

The newly added claim 32 recites a computer program product comprising a computer usable medium having computer readable program code means for performing the channel estimation, calculating the power average of tap coefficients, selecting a noise floor threshold, and setting the order of taps over the threshold. However, the specification fails to discuss what elements shown in the Figures are the computer readable program code means for performing the above functions.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 26-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 26 (line 9), claims 29-31 (line 1), and claim 32 (lines 7, 9, 11, 12-13, and 14), the phrases "the lowest average energies", "said channel taps", and "said computer" all lack antecedent basis.

Claim 32 (line 3) recites "a computer program product comprising a computer usable medium having computer readable program code means ...", however, claim 32 (lines 5-6) further recites said computer program product having: computer readable program code means (lines 7, 9, 11, and 14) for performing different functions. Applicants are requested to clarify the difference(s).

Wherein claims 27-28 are directly depended upon claim 26.

Response to Arguments

6. Applicant's arguments with respect to claims 1-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 966 113 A1 (Cited by Applicants in PTO-1449 filed on April 9, 2002) in view of Lindbom et al. (Newly cited).

EP 0 966 113 A1 discloses an equalizer 100 in the single Figure for performing equalization in a radio receiver receiving a signal from a transmitter.

The equalizer 100 comprises a channel impulse response (CIR) estimation circuit 1 for generating a plurality of tap coefficients; an assessment circuit 2 for assessing the tap coefficients; and an equalizer algorithm processing unit 5 for selecting and performing one of a plurality of different equalizer algorithms on the basis of the assessment signal when one or more of the tap coefficients may be disregarded.

The assessment circuit 2 comprises a signal-to-noise ratio (SNR) computation or estimation circuit 20, a threshold ponderation circuit 21, a taps removal circuit 22, a noise averaging circuit 31, a constraint length averaging circuit 32, a MS-BTS distance estimation circuit 33, an environment analysis circuit 34, a LMAX computation circuit 35, and a constraint length analysis circuit 40.

With respect to claims 1, 7, 13, 26, and 32, the initial channel estimation of the tap coefficients is performed by the CIR estimation circuit 1; the calculation of the average of the energy of the estimated taps is performed by the SNR estimation circuit 20; the selection of the noise floor threshold is performed by the threshold ponderation circuit 21; and the channel order of the tap coefficients selection above the threshold is performed by the taps removal circuit 22.

With respect to claim 13, since the equalizer 100 is part of a GSM mobile station receiver, therefore, it is well known in the mobile or radio communication receiver having a RF receiver unit and a demodulator circuit for RF receiving and demodulating a transmitter signal to a demodulated signal before estimating or equalizing the channel impulse response of the demodulated signal (col. 1, lines 13-20 and 52-57).

With respect to claim 32, EP 0 966 113 A1 teaches that the equalizer 100 is preferably by way of a suitably programmed digital signal processor (col. 10, lines 44-46).

Although EP 0 966 113 A1 teaches that the CIR estimation circuit 20 is a well known type estimation circuit (col. 5, lines 6-9), it does not explicitly show or suggest for calculating the average of the tap coefficients as recited in claims 1, 7, 13, 26, and 32.

Lindbom et al. (US Patent No. 5,581,580) also discloses a related channel estimation circuit in Figure 1 for use by a receiver in Rayleigh fading environments.

Lindbom teaches that the SNR estimator circuit 21 of Figure 1 may be estimated by averaging the squared error signal e that is generated in the channel estimator 26 and then taking the reciprocal of the average. The signal may then be multiplied by a quantity proportional to the signal level in order to give a better signal to noise ratio estimate. See column 5, lines 43-49.

Therefore, it would have been obvious to one of ordinary skill in the art to know that the SNR estimation circuit 20 shown in EP 0 966 113 A1's equalizer 100 is used to calculate the power average of the channel estimation in a well known manner.

With respect to claims 2, 4-6, 8, 10-12, 17, 19-21, 27, and 29-31, Lindbom teaches an algorithm that gives the performance of a Kalman type algorithm, but still has the low complexity of a much simpler algorithm like the Lease Means Squares estimator (col. 2, lines 21-24); a mobile radio channel is typically modeled as a zero mean, complex valued stochastic process known as a Rayleigh fading channel (col. 2, lines 63-66); and a detector may be needed if the channel, besides being time varying,

also is time dispersive. In this case, an equalizer is usually employed as a detector. An equalizer requires knowledge of the channel characteristics which requires that the channel characteristics be tracked if they vary with time. See column 1, lines 16-21.

With respect to claims 3, 9, 18, 25, and 28, EP 0 966 113 A1 teaches that in a typical GSM mobile station, the correlation between the locally stored midamble and the received signal is measured at 10 or 11 different times with a period of time, which is equal to the length of time taken to transmit a single bit of information, between each of the different times (col. 1, lines 52-57).

With respect to claims 22-24, the equalizer algorithm processing unit 5 is operated by a Viterbi equalizer or detector or estimator 51. Therefore, it is obvious to a person skill in the art that a Viterbi equalizer or estimator uses MLSE or DFE technique.

With respect to claims 14-16, although both EP 0 966 113 A1 and Lindbom do not show the speech decoder for decoding the equalization signal to a speaker though a voice decoder or D/A converter or a switch circuit for converting the decoded signal to a data stream. It is well known to a person skill in the art that a speech decoder and a voice decoder are need in order to convert the equalization signal to a voice signal in a GSM mobile station since the equalizer 100 is used in GSM mobile station or convert the decoded signal to data stream, such as speech signals.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Skold (US Patent No. 5,903,610) discloses a receiver comprising

a maximum likelihood sequence estimator and a synchronization and channel estimation circuit by averaging a long channel estimate with a short channel estimate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Young Tse** whose telephone number is **(703) 305-4736**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Young T. Tse
Primary Examiner
3/28/04